CLAIMS

What we claim is:

1. A method of detection of an event in which electron translation is accompanied by photon emission, which comprises detecting a change in electromagnetic field strength caused by the event.

2. The method of claim 1 wherein said event is of known cause and recording a time course of said change in electromagnetic field strength as a characterization of said event.

3. The method of claim 1 wherein said event is of unknown cause, recording a time course of said change in electromagnetic field strength, and comparing said time course with predetermined time courses of known events in which electron translation is accompanied by photon emission, to determine the cause of the unknown cause event.

4. The method of any one of claims 1 to 3 wherein said event comprises a chemical reaction, a molecular interaction, a geoterrestial phenomena and/or a change of state of matter.

5. The method of claim 4 wherein said event is an enzyme reaction and the electromagnetic consequences of such enzyme reaction are detected and measured from samples at temperatures which are suitable or optimal for the enzyme reaction of interest.

6. The method of any one of claims 1 to 5, wherein said recorded characteristic time course of said change in electromagnetic field strength is analyzed to obtain information relating to said event.

7. The method of claim 6 wherein said analysis is effected by FAST FOURIER TRANSFORM (FFT) procedures or related forms of spectral analysis.

8. The method of claim 7 wherein said FFT procedures are enhanced, augmented and/or assisted by at least one other form of signal analysis.

9. The method of claim 8 wherein said other forms of signal analysis is pattern recognition and/or waveform-trend forecasting.

10. The method of any one of claims 1 to 9 wherein said change in electromagnetic field strength is detected by a magnetometer capable of

generating an electrical signal of strength proportional to the electromagnetic field strength produced by the event.

11. The method of claim 10 wherein said change in electromagnetic field strength is recorded by recording the change in strength of the electrical signal produced by the magnetometer.

12. A method of detecting a chemical substance, which comprises:

detecting fluctuations in spontaneous intraatomic electron and nuclear quantum states of said substance as an identification of the substance.

13. The method of claim 12 wherein the substance is concealed.

14. The method of claim 13 wherein the concealed substance is an explosive, radioactive isotope or chemically active organic matter.

15. The method of claim 12 wherein the substance is remotely located.

16. A method of detecting a chemical substance, which comprises:

detecting near or propagating electromagnetic fields originating from atoms in the substance as an identification of the substance.

17. The method of claim 16 wherein the substance is concealed.

18. The method of claim 17 wherein the substance is in its ground state.

19. The method of claim 18 wherein the substance is an explosive, radioactive isotope or chemically-active organic matter.

20. The method of claim 16 wherein the substance is remotely located.

21. An apparatus for detecting and recording an event in which electron translation is accompanied by photon emission, including photon emission in the microwave-energy range, which comprises:

magnetometer means for generating an electrical signal of strength proportional to an electromagnetic field strength produced by the event, and

recording means for recording a time course of said electrical signal produced by said magnetometer means for a period of time for which said electrical signal is produced.

22. The apparatus of claim 21 further comprising analysis means for analyzing a time course of said electrical signal recorded by said recording means to determine a time course of said event.

23. The apparatus of claim 21 wherein said magnetometer means is a Hall effect probe.

24. The apparatus of claim 23 wherein said Hall effect probe utilizes gallium arsenide.

25. The apparatus of claim 21 wherein said magnetometer means is a superconducting quantum-interference detector probe or any other detector probe of suitable electromagnetic sensitivity, selectivity, frequency response and stability.

26. An apparatus for detecting a chemical substance, which comprises:

magnetometer means for generating an electrical signal of strength proportion to an electromagnetic field strength produced by spontaneous fluctuations in intraatomic electron and nuclear quantum states of the substance or near or propagating electromagnetic fields originating from atoms in the substance, and

recording means for recording a time course of said electrical signal produced by said means for a period of time for which said electrical signal is produced.

27. The apparatus of claim 26 further comprising analyzing means for analyzing a time course of said electrical signal recorded by said recording means to determine the identity of the substance.

28. The apparatus of claim 26 wherein said magnetometer means is a Hall effect probe.

29. The apparatus of claim 28 wherein said Hall effect probe utilizes gallium arsenide.

30. The apparatus of claim 26 including waveguide radiator for detecting materials remotely.

31. The apparatus of claim 26 including a broadband stochastic resonance generator system in close proximity to the magnetometer means.